NOAA FISHERIES

West Coast Region

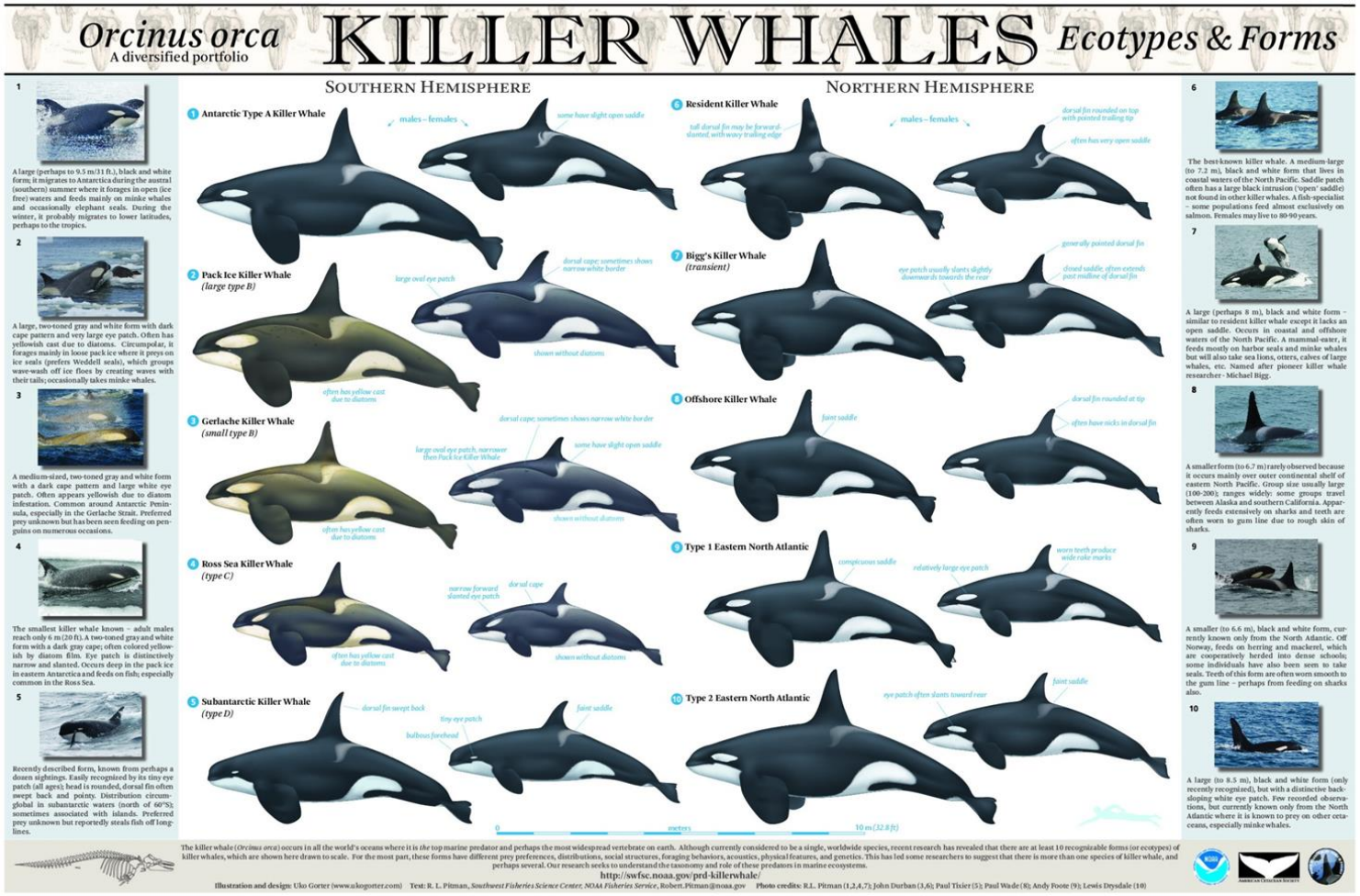
Endangered Southern Resident Killer Whales

10 Years of Research and Recovery

Lynne Barre

Killer Whales

- The most widely distributed mammal (other than humans)
- Abundant in coastal waters and high latitudes



Pacific Northwest Ecotypes

- Transients
  - Marine mammal eaters
  - Small groups
- Offshores
  - Limited information
  - Eat fish, sharks (?)
  - Large groups
- Residents

Photo by Robin Baird

Southern Resident Killer Whales

- Stable family groups
- Salmon prey (Chinook)
- Use sound to find food and communicate
- Distinct dialects
- Unique behaviors

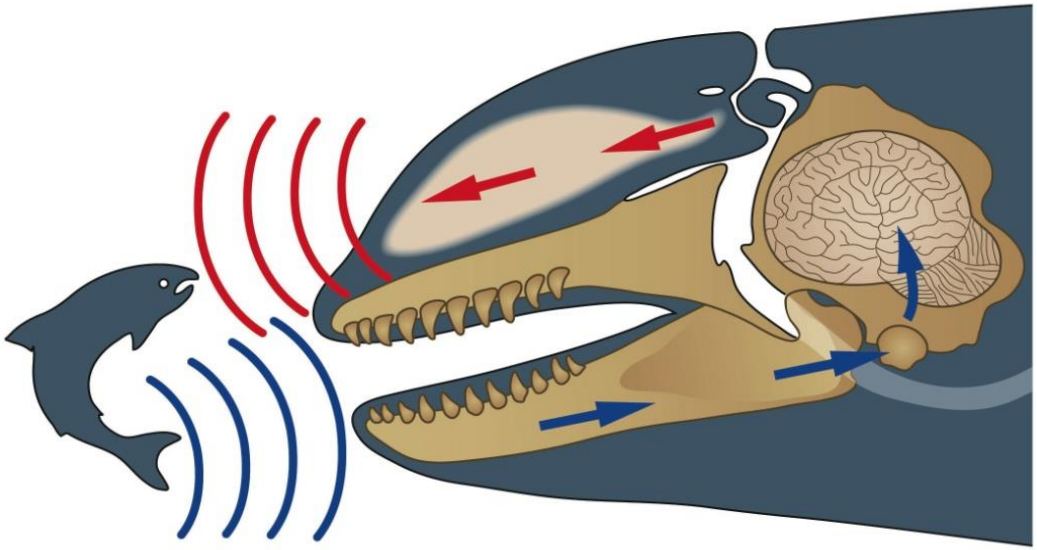
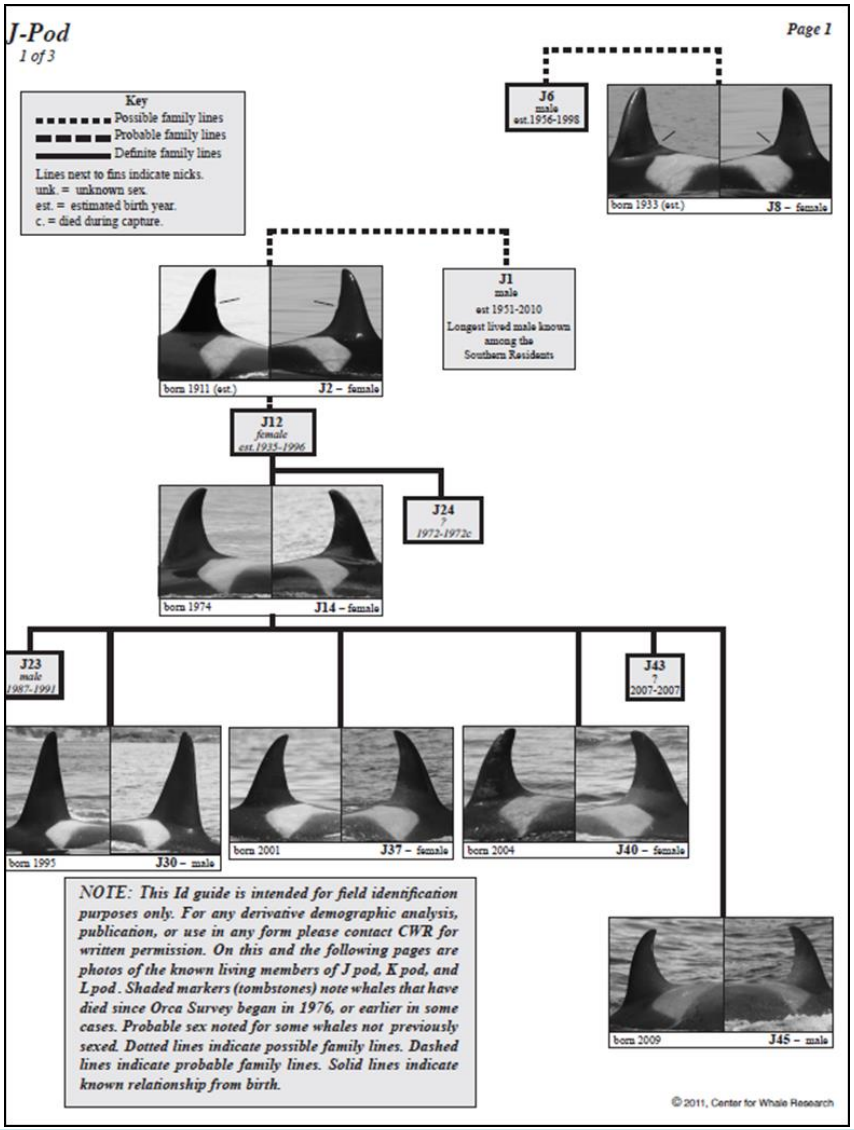
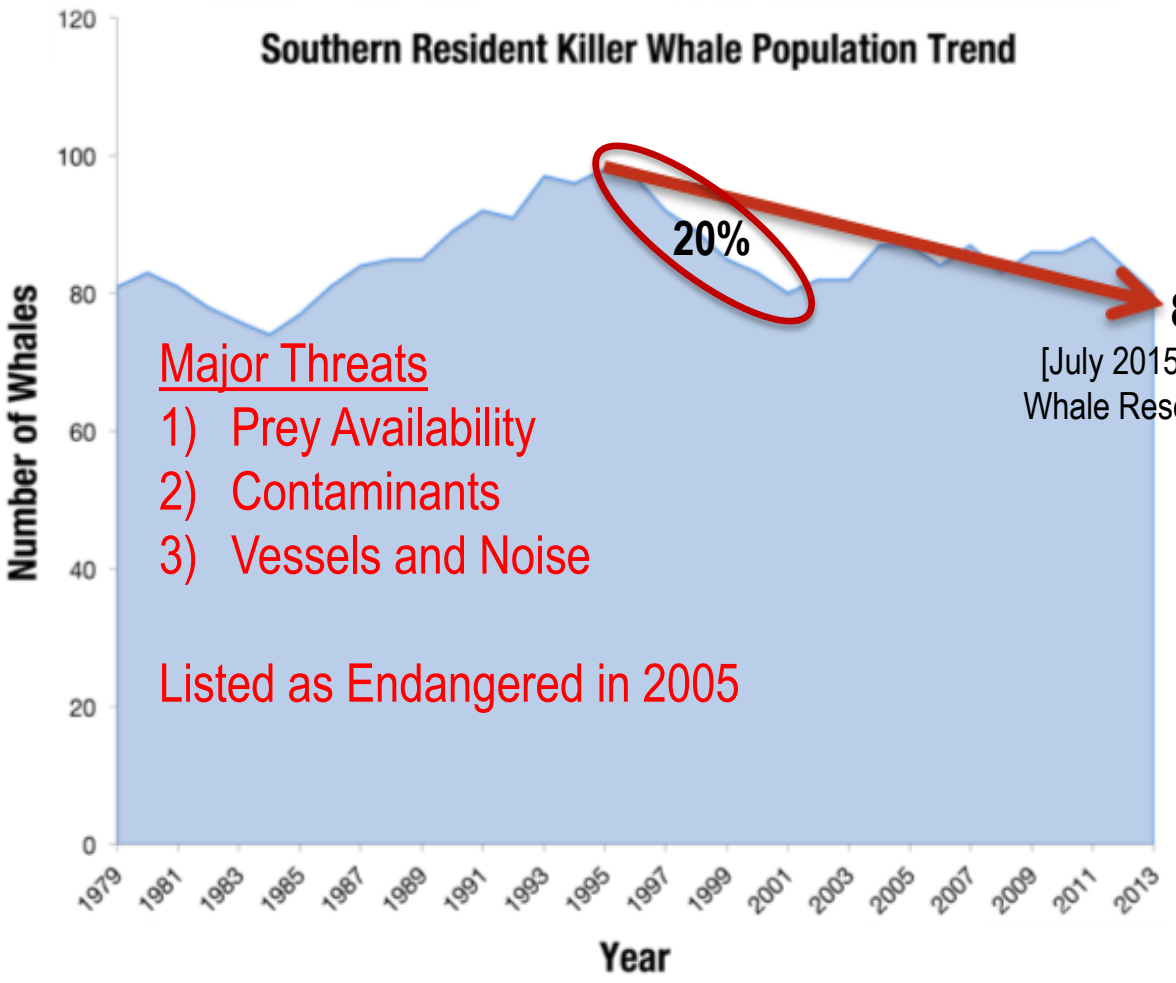


Illustration by Uko Gorter

Southern Resident Killer Whales

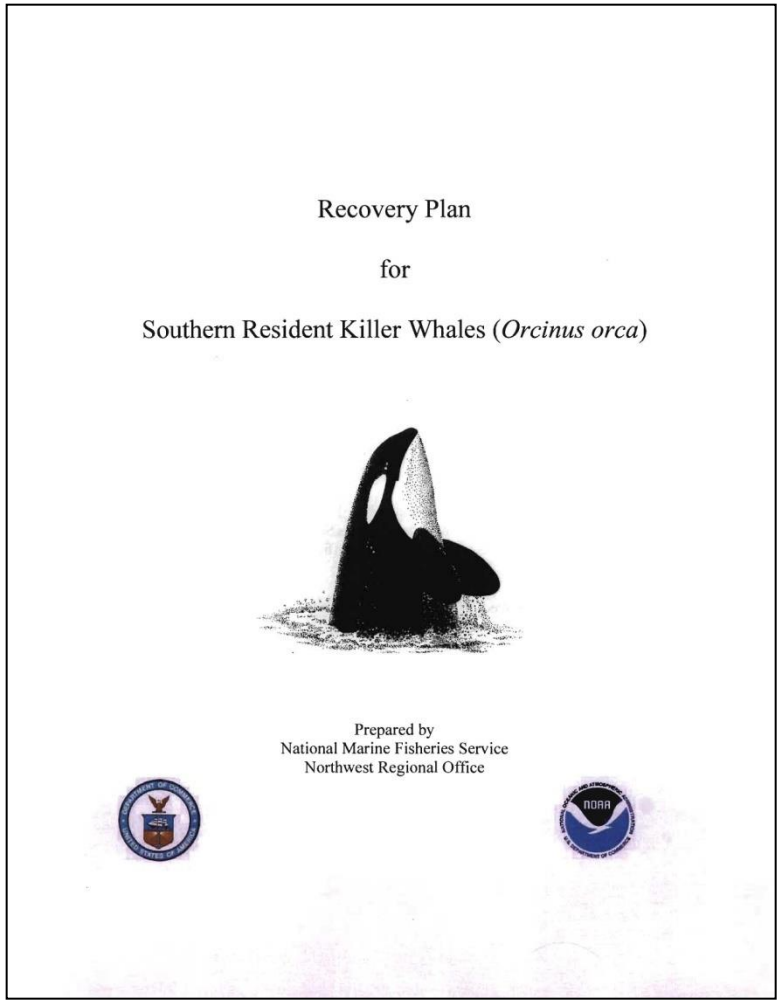


Southern Resident Decline and Risks

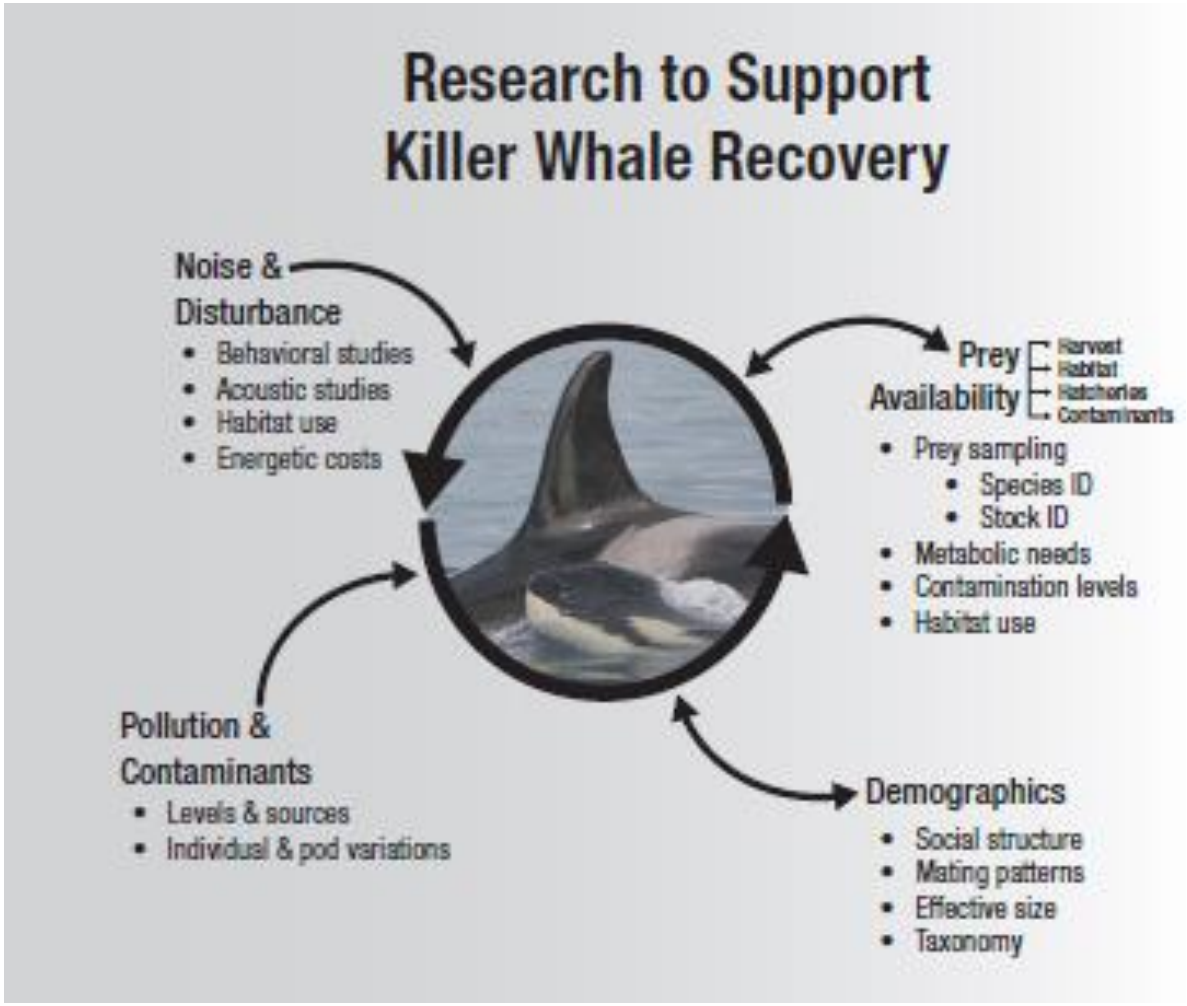


Recovery Plan

- Started implementing actions in 2003 with specific funding
  - —Research
  - —Enforcement support
  - —Education
- Recovery Plan complete 2008
- Broad approach to address all threats
- Adaptive process to incorporate research results as available



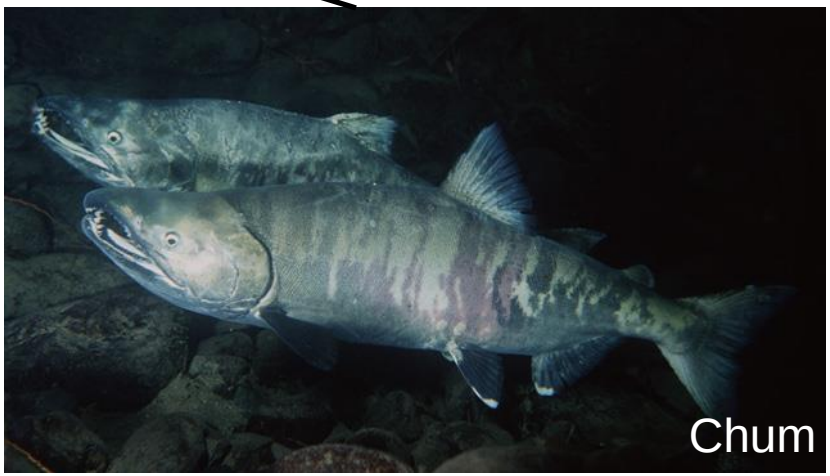
Ongoing and Future Research



Prey Availability

Prey

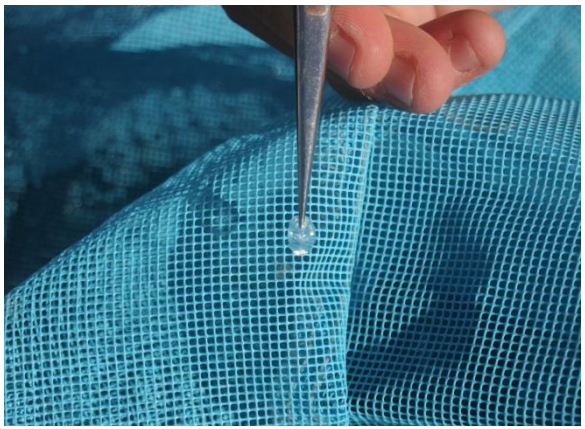
Are there enough fish for the whales?



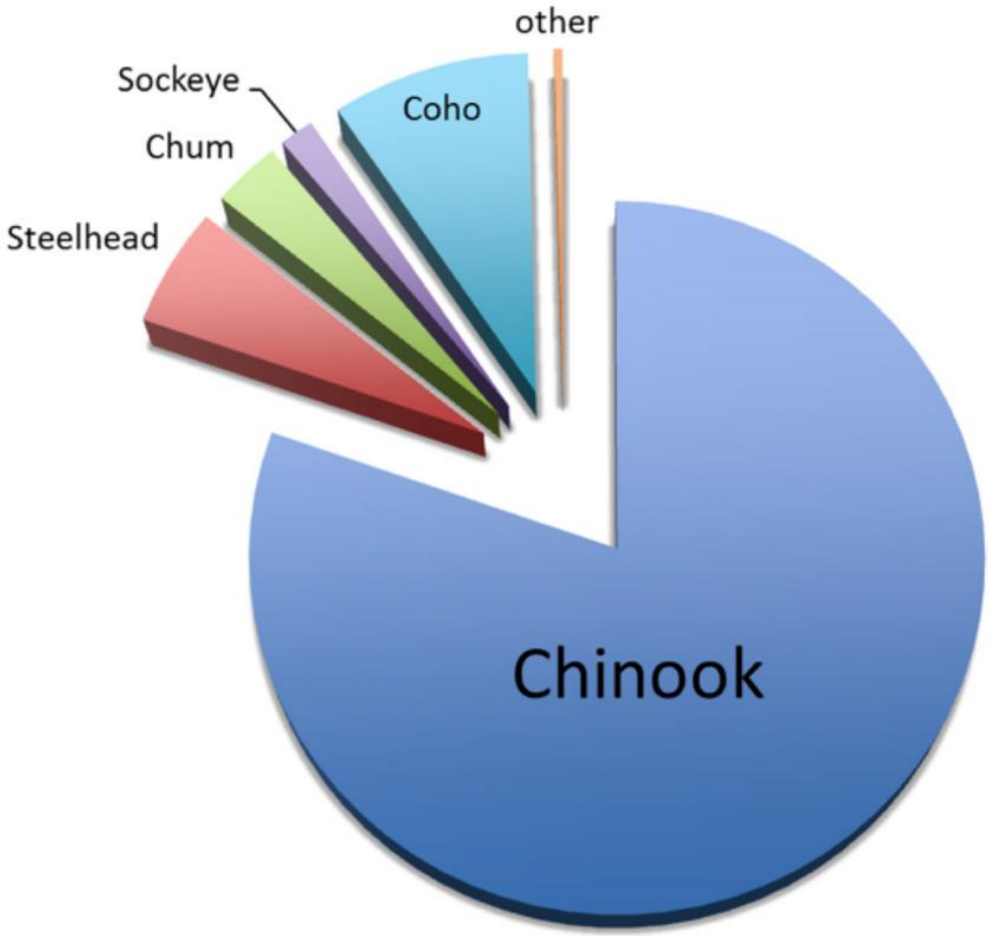
Prey Selection Field Methods


Photo: CWR


Photo: CWR



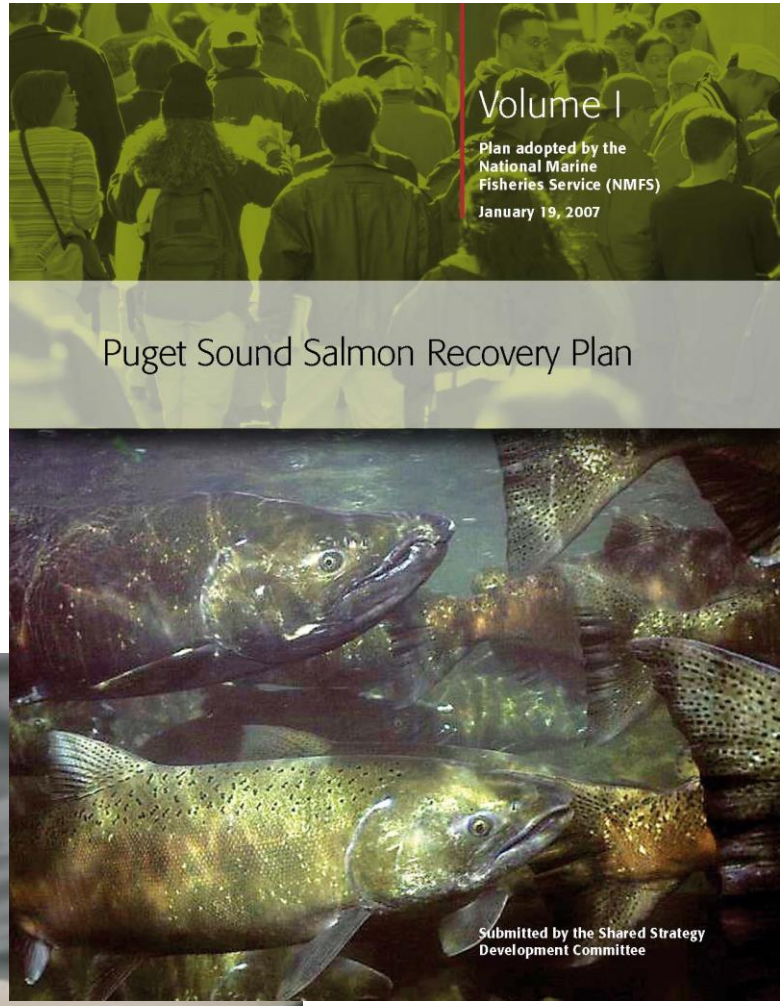
Composition of the Southern Residents' Summer Diet



Scale and tissue samples from prey collected in Southern Residents' summer range (includes the Western Juan de Fuca Strait and San Juan Island) from May to September 2004-2008. More than 75% of the whales' summer diet is Chinook. Selection varies somewhat by month. From Hanson et al. 2010.

Prey

- Coordinating with ongoing salmon recovery efforts
- Review of salmon fisheries and Southern Resident killer whales



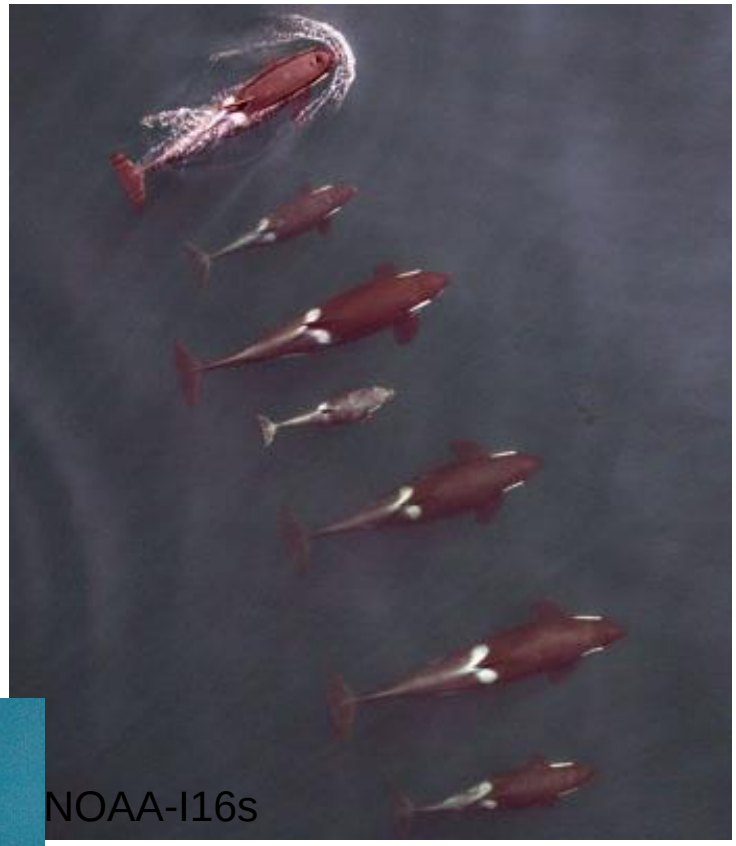
Photogrammetry

- Where and when are the whales food limited? How can we prioritize salmon recovery to benefit the whales?

NOAA

Photogrammetry

- Measuring aerial photos to understand health and reproduction
- Compare Northern Residents and Southern Residents



NOAA-I16s

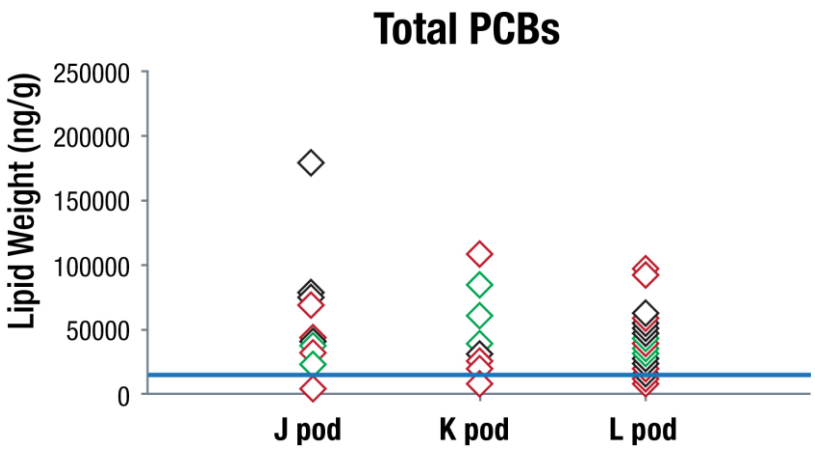
NOAA- J28

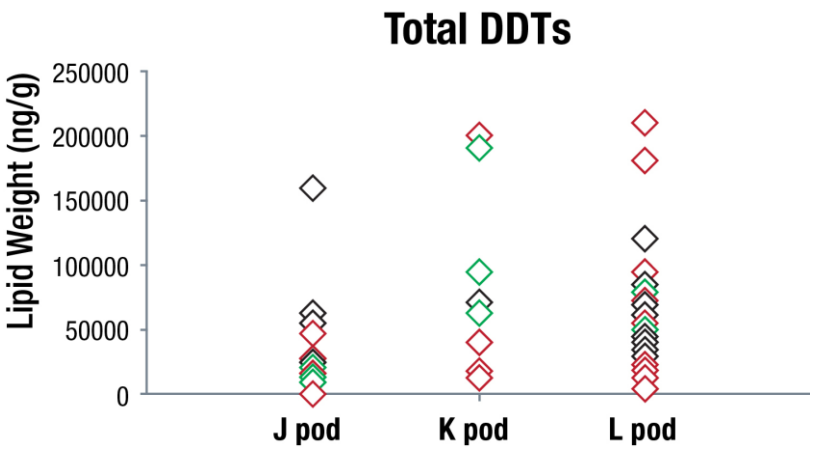
Contaminants

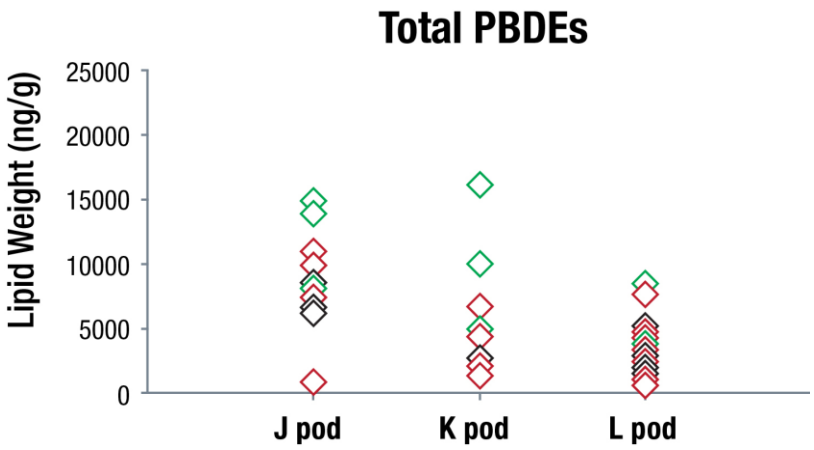
Pollution and Contaminants

Killer whales are at the top of the food chain

- Bioaccumulation of contaminants (PCBs, DDTs, PBDEs)
- High levels can cause reproductive and immune problems







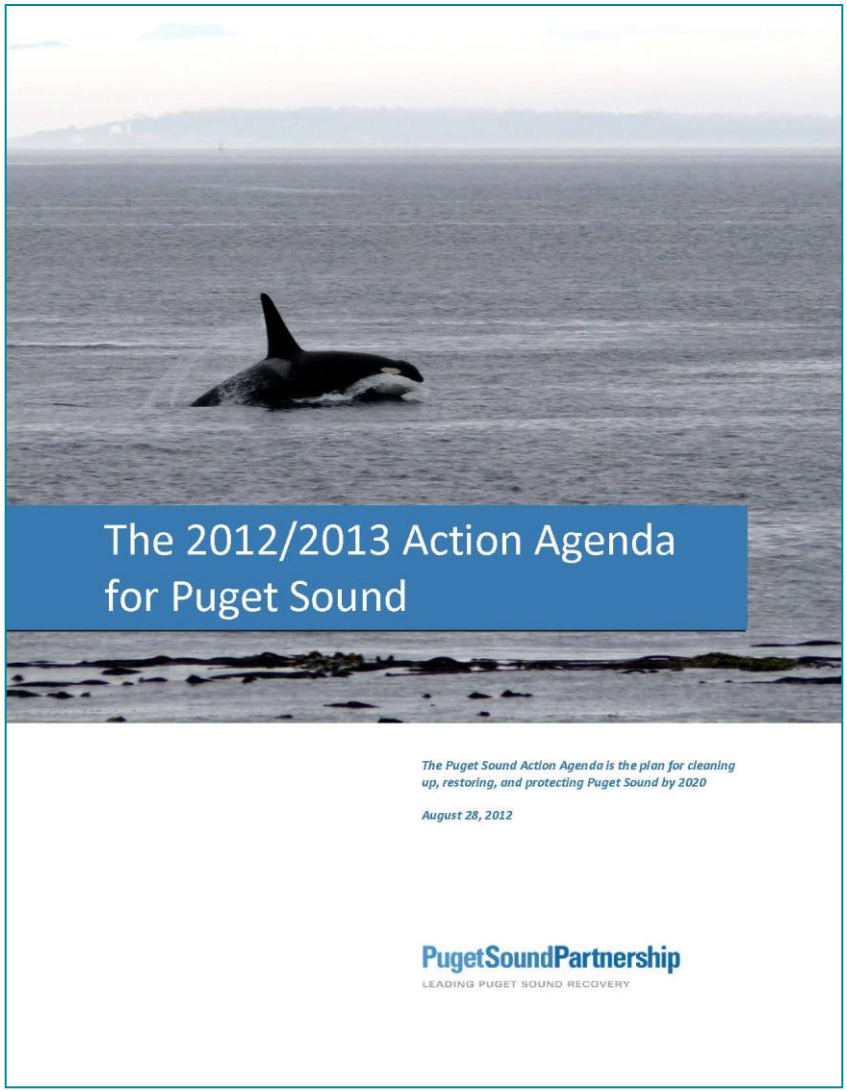
Legend:
Black- Maturing and adult males 13 years and older
Red – Adult females 12 years and older
Green – Juvenile and sub-adult whales
Blue line – the level we know generates negative health effects in other marine mammals

Figure generated from Krahn et al. 2007, 2009 and NWFSC unpublished data.

Contaminants

Puget Sound Partnership

- Action Agenda to restore Puget Sound by 2020
- Working group with EPA and WA state agencies

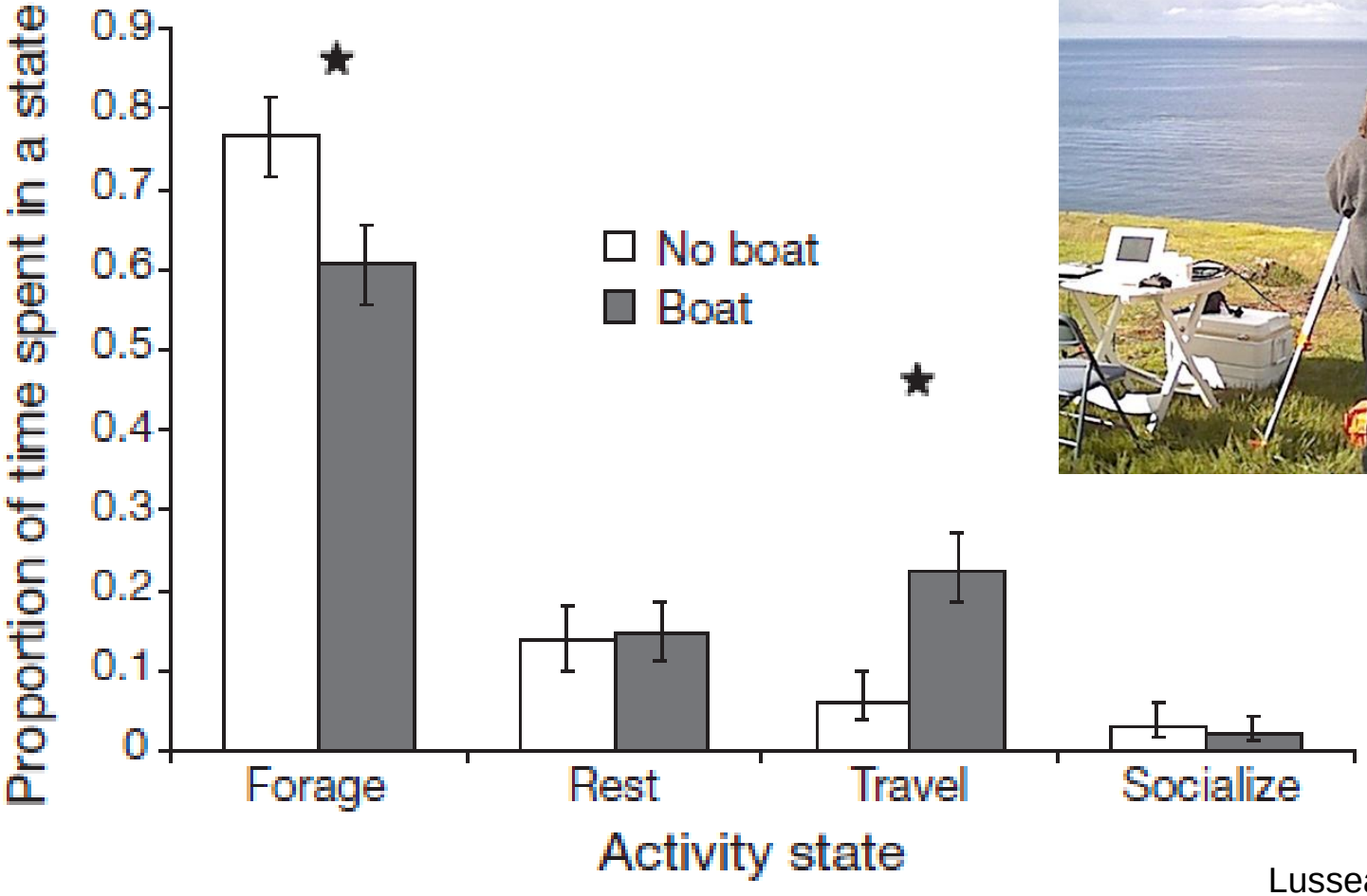


Vessels and Noise

Vessels and Noise

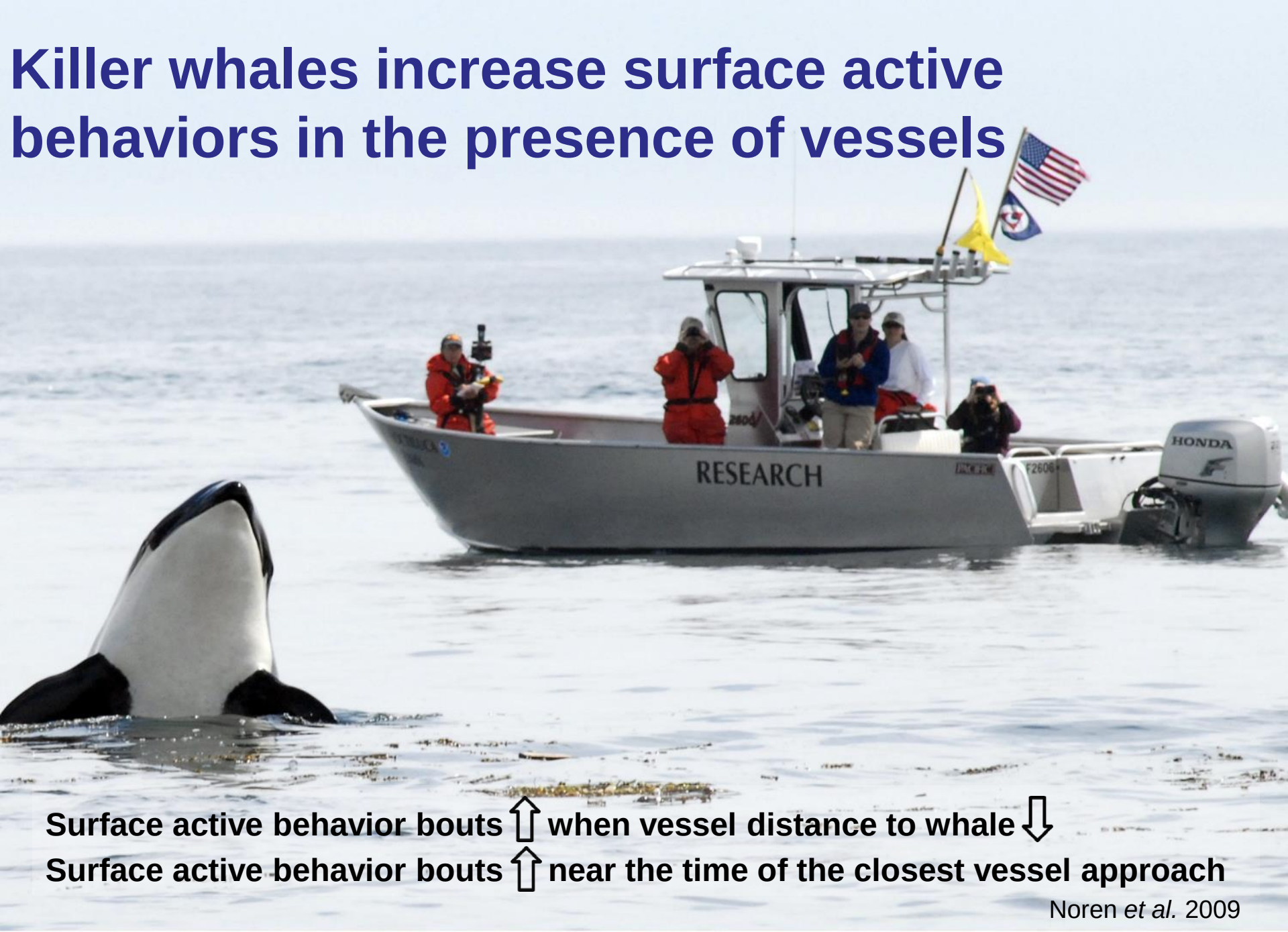
Killer whales use echolocation to find food and use sound to communicate and navigate

Foraging is reduced and travel is increased when vessels are present within 400 m



Lusseau *et al.* 2009

Killer whales increase surface active behaviors in the presence of vessels



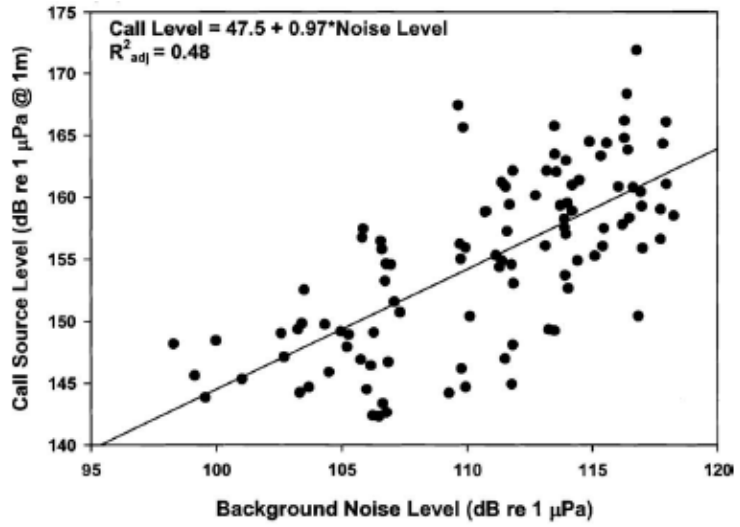
Surface active behavior bouts ⇧ when vessel distance to whale ⇩

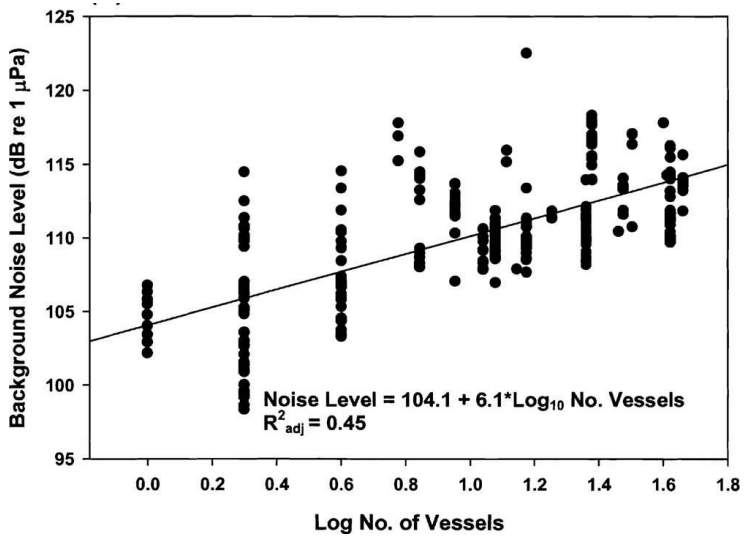
Surface active behavior bouts ⇧ near the time of the closest vessel approach

Noren *et al.* 2009

Killer whales modify calls in response to background noise levels

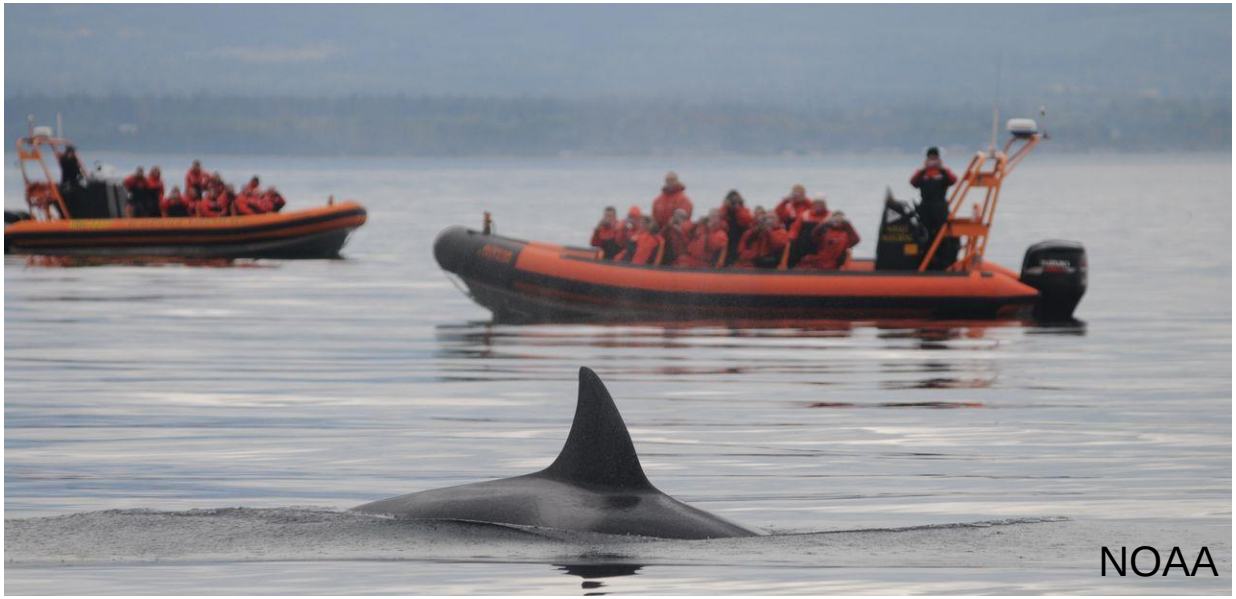
- SRKW call source levels increase with increasing ambient noise
- Background noise increases with number of boats





Holt *et al.* 2009

Protective Regulations



The final regulations make it unlawful for vessel operators to:

1. Cause a vessel to approach, in any manner, within 200 yards of any killer whale.

2. Position a vessel to be in the path of any killer whale at any point located within 400 yards of the whale.

Implementation of New Regulations

Education and Outreach

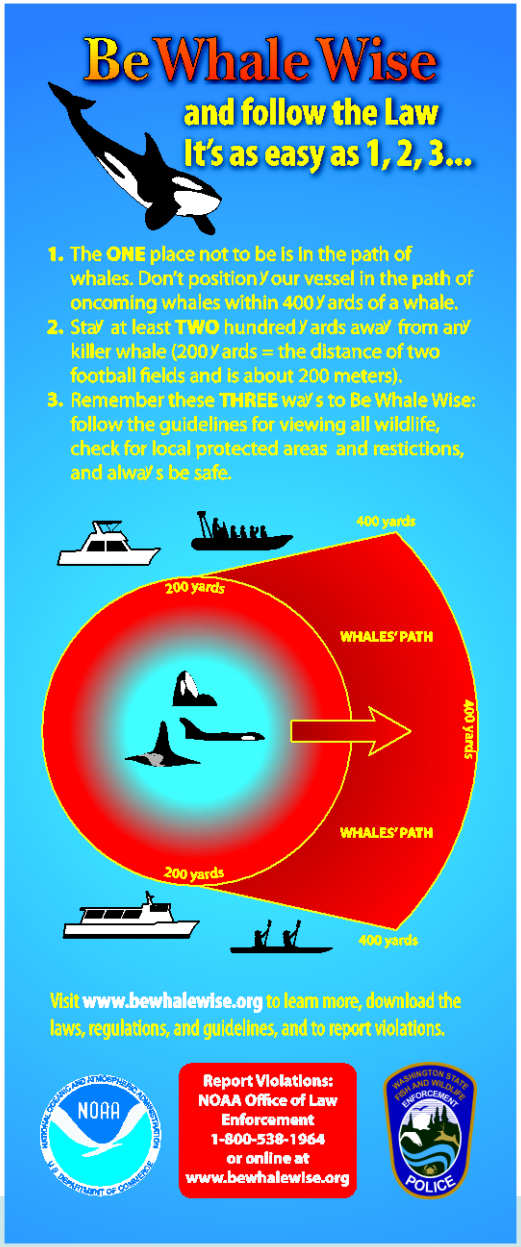
- Continue working with partners- Soundwatch, Straitwatch, WDFW, DFO
- Update Be Whale Wise

Enforcement

- Joint Enforcement Agreement with WDFW, ESA grant

Monitoring

- Collect data on vessel activity/compliance
- Collect data on economic impacts



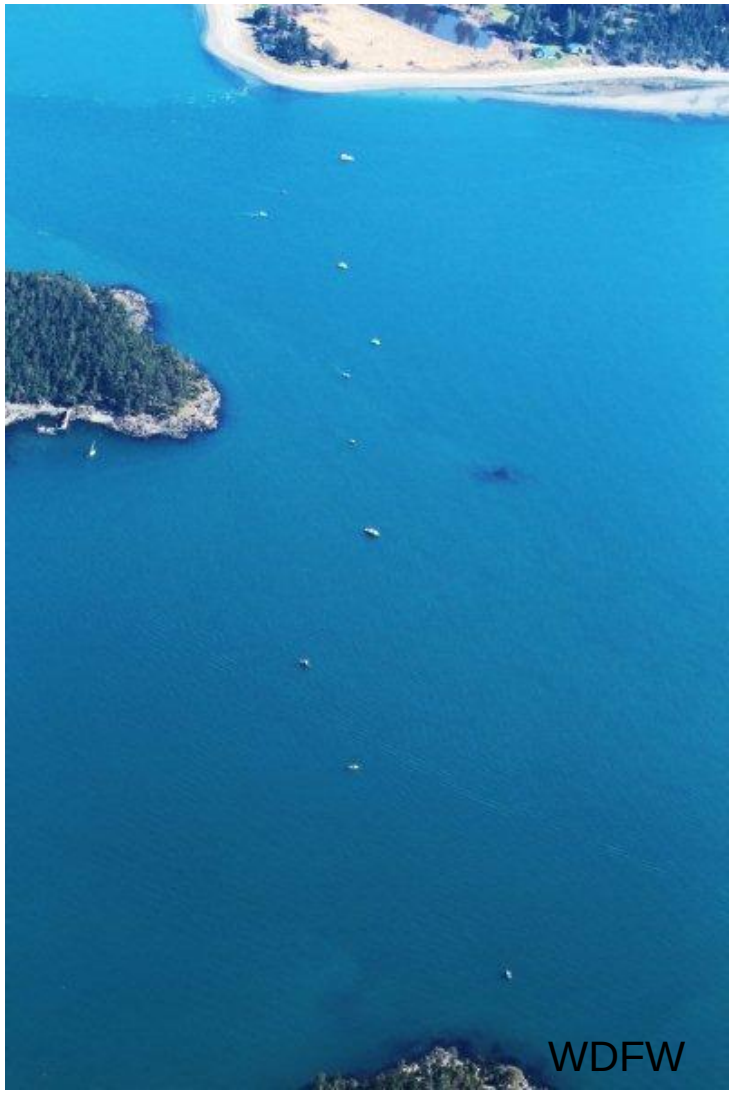
Other Risk Factors

Social structure and distribution make the Southern Residents vulnerable to

- Oil spills
- Disease

Oil Spill Response Plan

- Action in Recovery Plan and Recovery Criteria
- Draft Response Plan-Appendix to the Northwest Area Contingency Plan
- Spill drill March 2013, San Juan Islands with IOSA and WDFW



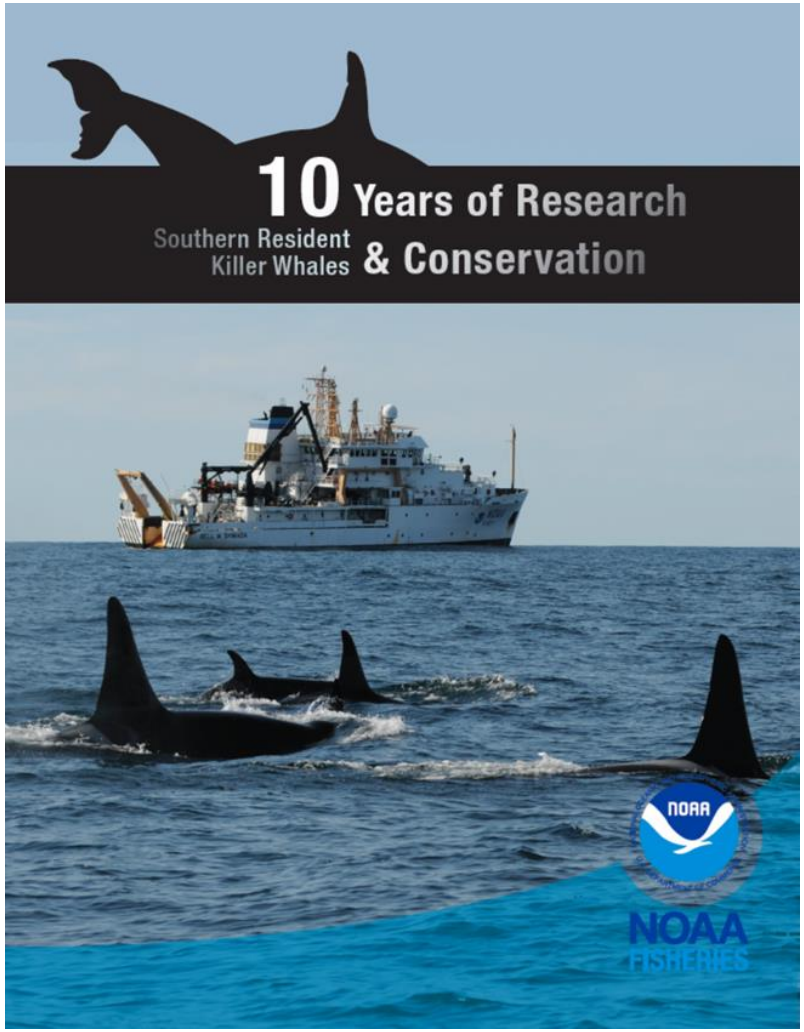
Strandings

- Increase reporting
- Conduct full exams and necropsies
- Determine cause of death
  - Disease
  - Human interaction
  - Natural causes

ESA Section 7 Consultations

- Fisheries regulations
- Hydropower actions (including hatchery production)
- Water treatment plants, sewer outfalls
- In-water construction
  - Pile driving sound, increase in vessels (docks, marinas), dredging (contaminated sediments)
- Upland projects (Flood Insurance Program)
- Habitat restoration (creosote pile removal)
- Research on Southern Resident killer whales
- Tidal and wave energy projects, LNG terminals
- Navy and Coast Guard operations

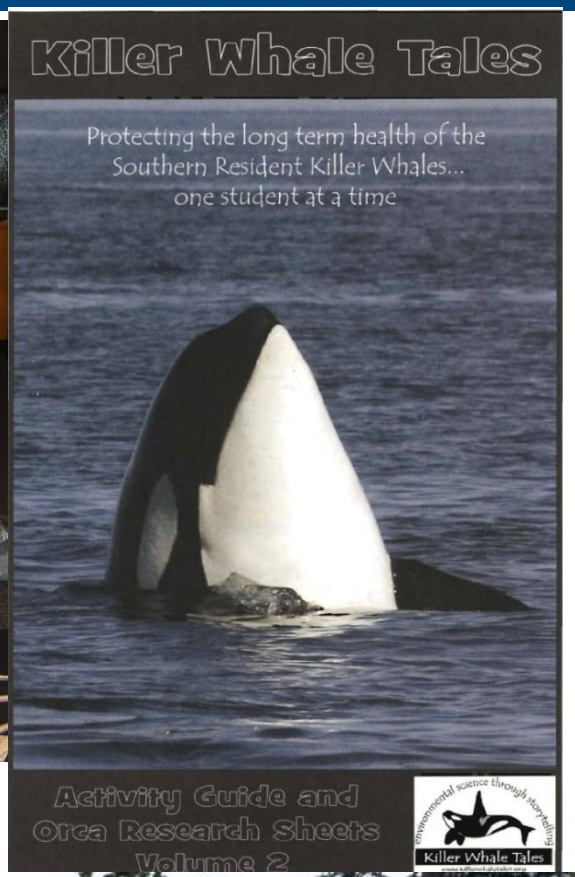
The Next 10 Years

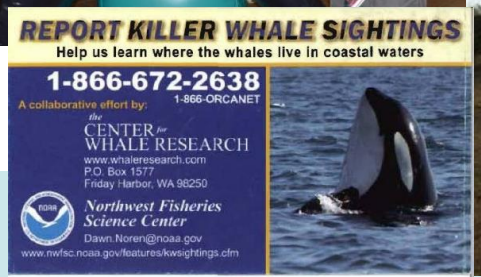


- Winter distribution and diet
- Model competition from other salmon predators
- Assess effectiveness of regulations
- Conduct health assessment incorporating information on prey, contaminants, disease
- Evaluate coastal critical habitat

Outreach Partners

- OCNMS
- The Whale Trail
- Seattle Aquarium
- The Whale Museum
- Soundwatch
- Killer Whale Tales
- Sighting Networks
- Naturalists
- Whale Watch Assoc.
- NGOs



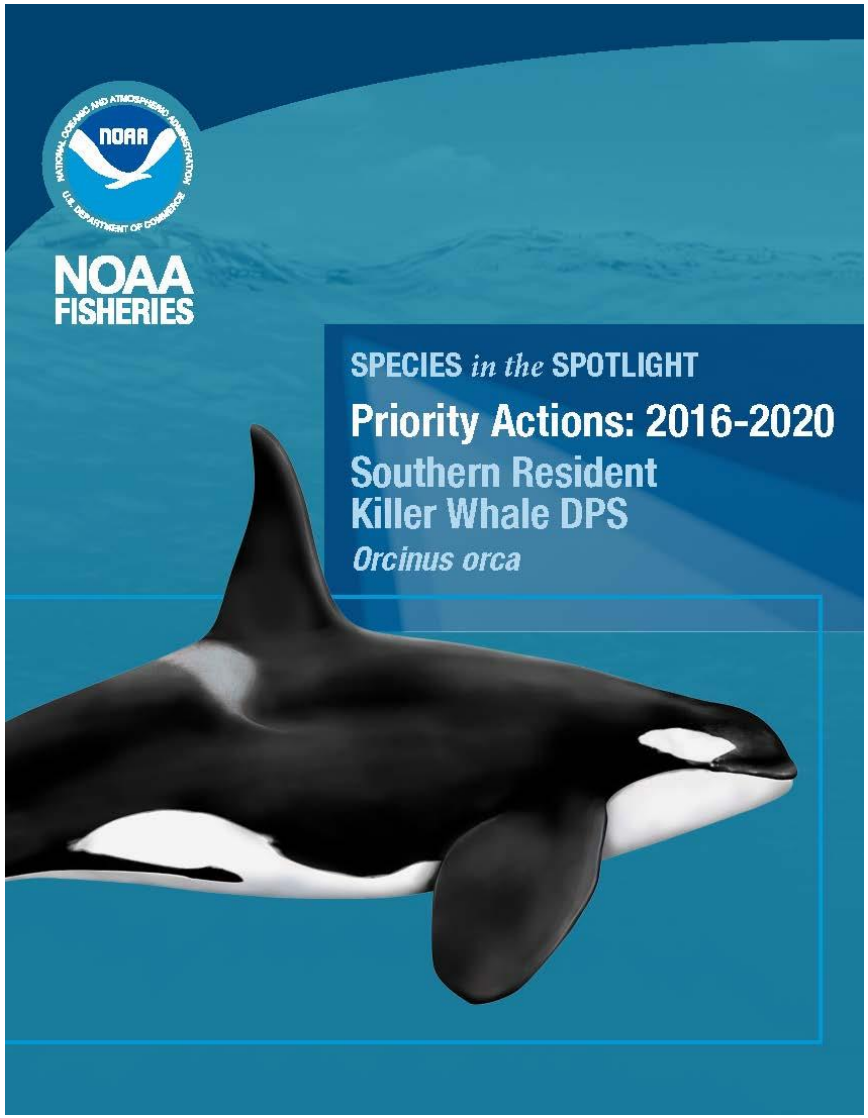


NOAA FISHERIES

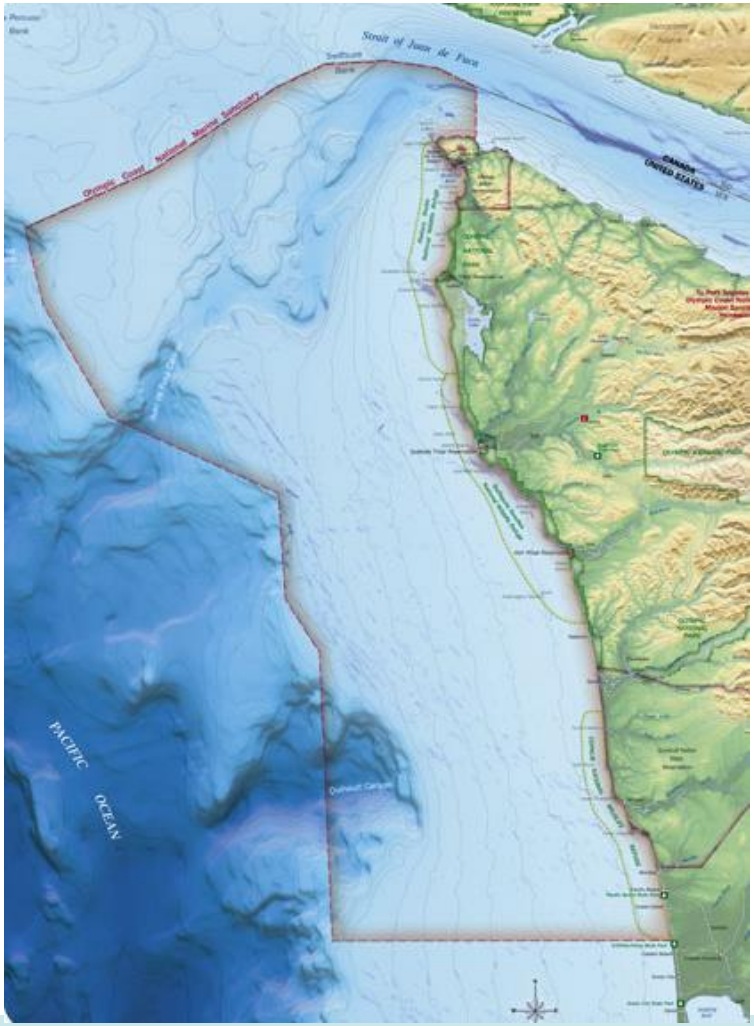
Species in the Spotlight

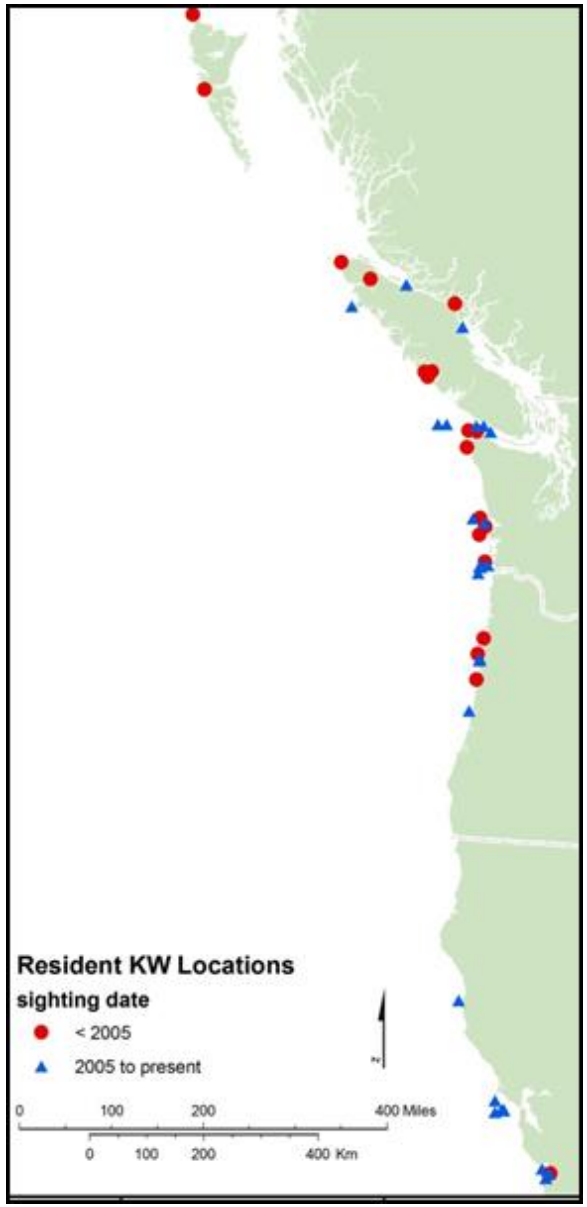
- Southern Resident killer whales one of eight at-risk species
- Action Plan identifies key actions and partners
  - Enforcement of vessel regulations
  - Target recovery of critical prey
  - Protect coastal habitats
  - Improve knowledge of health*
  - Education and outreach

http://www.nmfs.noaa.gov/stories/2015/05/05_14_15species_in_the_spotlight.html



Southern Resident Killer Whales and OCNMS



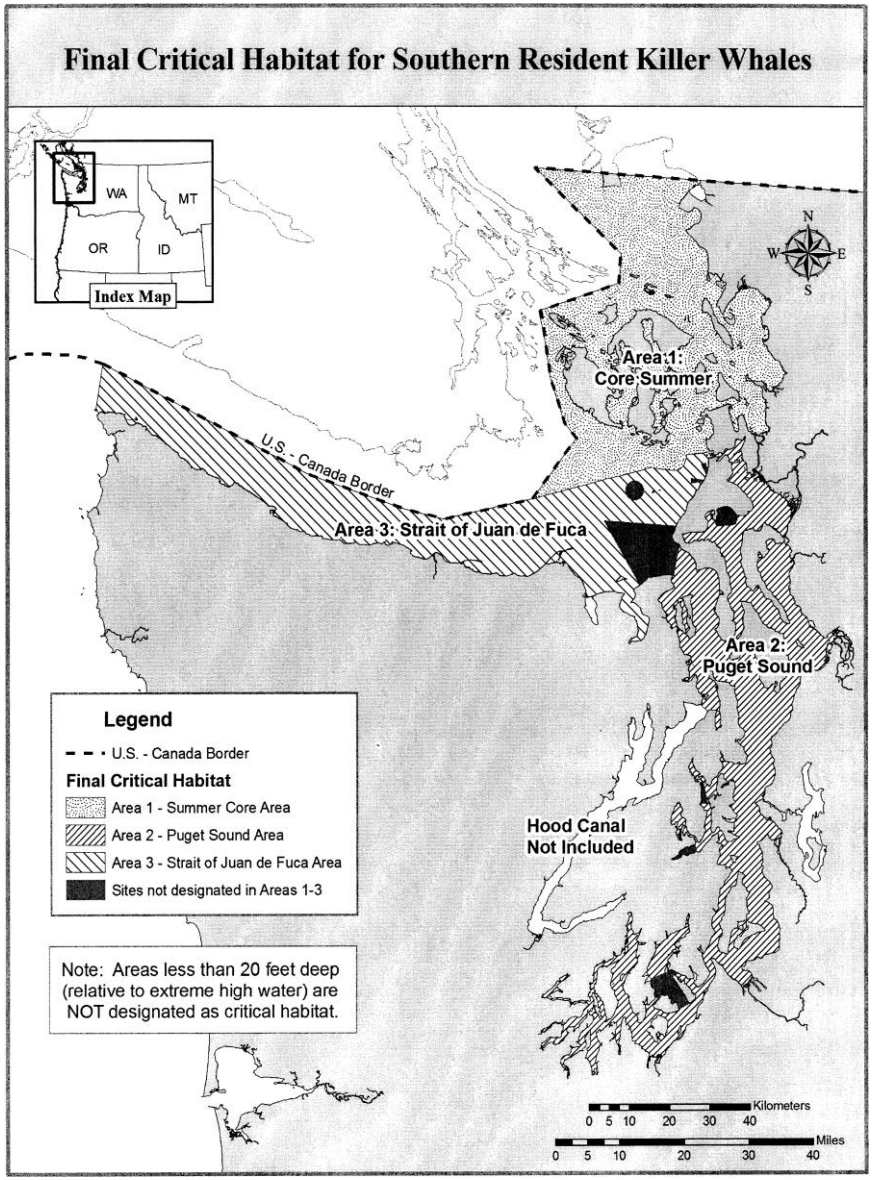


-~35 coastal sightings since 1982

Critical habitat

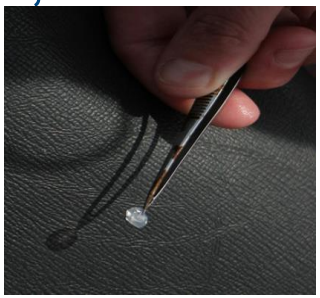
NMFS designated critical habitat on November 26, 2006 (71 FR 69054)

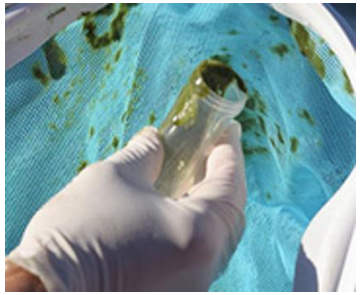
- Approximately 2,560 square miles
- Primary constituent elements/essential features are:
  - (1) Water quality to support growth and development
  - (2) Prey species of sufficient quantity, quality, and availability to support individual growth, reproduction, and development, as well as overall population growth
  - (3) Passage conditions to allow for migration, resting, and foraging.



Projects to improve our understanding of the range of SRKWs

- Satellite tagging of individuals
- Research cruises
- Acoustic monitoring along the coast
- Identification of prey species (stable isotopes, prey sampling, fecal sampling)
- Sightings





Revisions to critical habitat

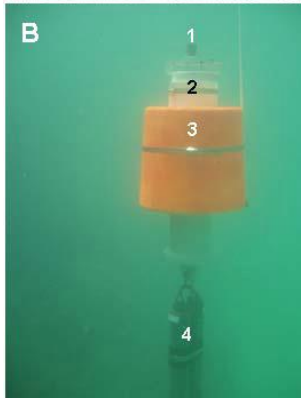
- January 21, 2014: NMFS received a petition to revise critical habitat and consider coastal waters from Cape Flattery, WA to Point Reyes, CA and include protective in-water sound levels as a PCE in both current inland and possible coastal critical habitats.
- April 25, 2014: NMFS published its 90 day finding (79 FR 22933) that the petitioned action may be warranted and initiated a review and solicited scientific and commercial information pertaining to the action.
- February 24, 2015: NMFS published its 12 month finding (80 FR 9682) that we intend to proceed with the petitioned action and described how we plan to proceed, including ensuring that we have the best available information.

Next Steps

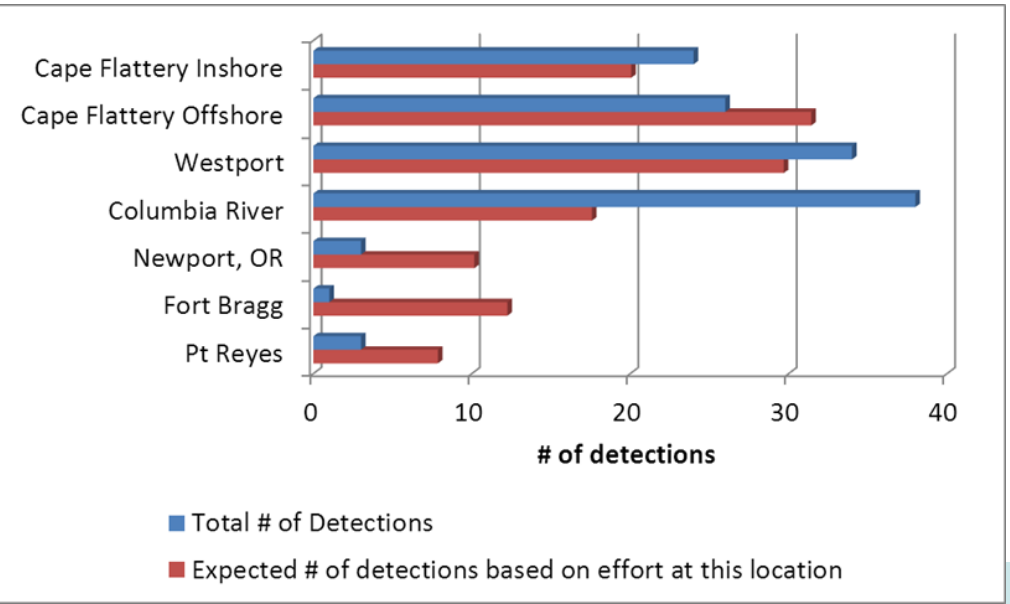
- *Step 1: Complete Data Collection and Analysis (ongoing)*
- *Step 2: Identify Areas Meeting the Definition of Critical Habitat (in process)*
- *Step 3: Section 4(b)(2) Analysis (upcoming)*
- *Step 4: Develop Proposed Rule for Public Comment (by fall 2017)*

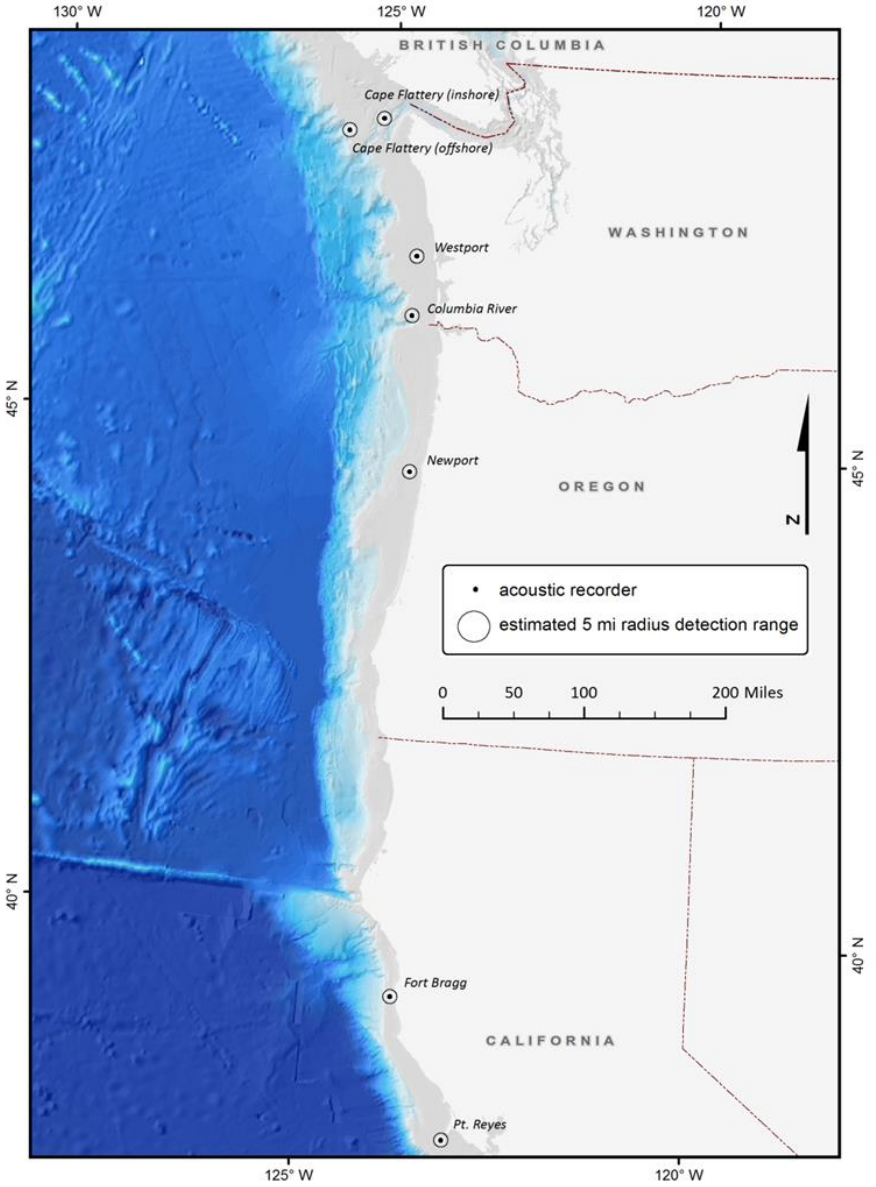
Passive Acoustic Recorders

Jeff Nystuen (APL) - PAL



Ecological Acoustic Recorder (EAR)





Satellite Tagging

Satellite Tagging

Eight adult males (J26, K25, L88, L87, J27, L84, K33, L95) tagged 2012-16

K25 tagged in Puget Sound
93-day transmission: 12/29/12 to 4/4/13

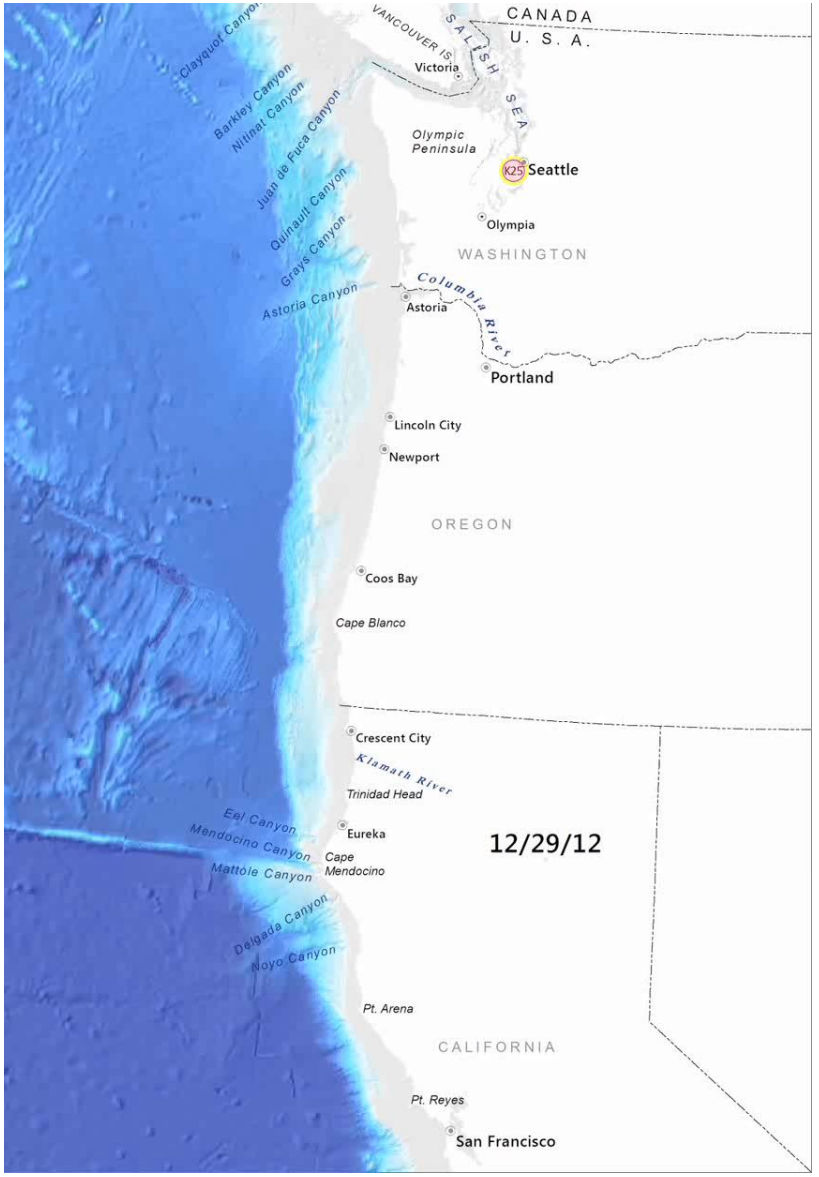
- Median distance from shore - 8.4 km

- Median depth – 60m

Coastal diet samples

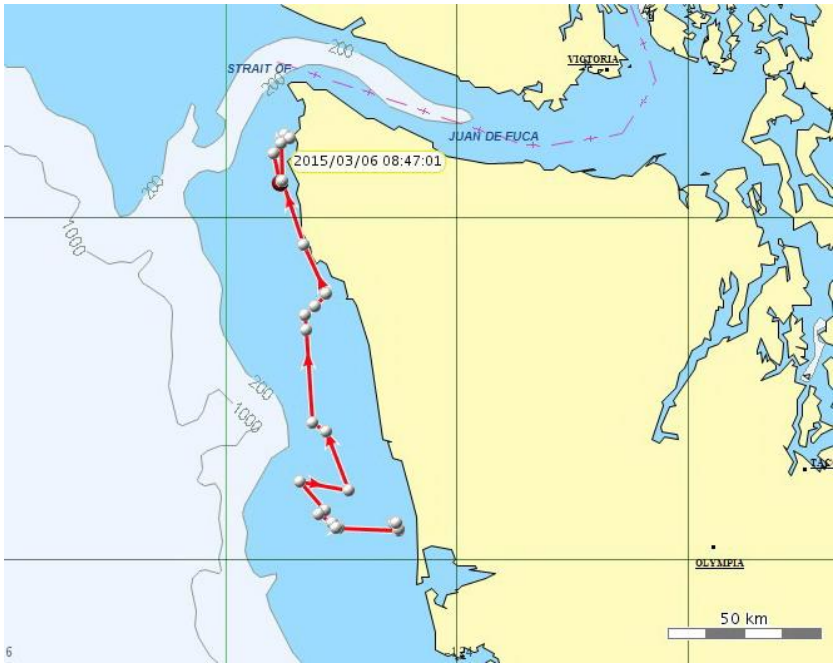
California - 2 scale/tissue samples,1 fecal sample

OR and WA - 23 scale/tissue samples, 21 fecal samples



Satellite Tagging and 2015 NOAA Cruise

Tag on J27 and L84 (96 days)
New calf sighted- L121
Coastal diet samples



Satellite Tagging and 2016 NOAA Cruise

Tags on K33 and L95
Coastal diet samples

K33 2/16/16

L95 2/25/16

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http://www.westcoast.fisheries.noaa.gov/protected_species/marine_mammals/killer_whale/email_listserve.html